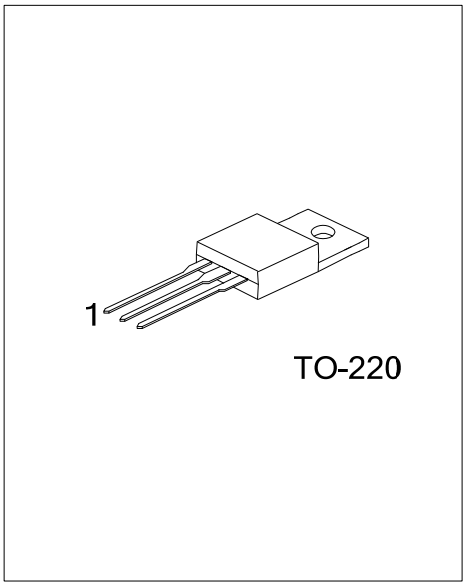
UT60N08M

Preliminary | ***Power MOSFET***

60A, 80V N-CHANNEL POWER MOSFET



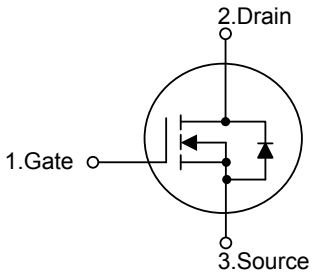
■ DESCRIPTION

The **UTC UT60N08M** is a high voltage and high current power MOSFET, designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient AC to DC converters and bridge circuits.

■ FEATURES

* $R_{DS(ON)} \leq 12\ m\Omega$ @ V_{GS}=10V, I_D=30A
  $R_{DS(ON)} \leq 15\ m\Omega$ @ V_{GS}=4.5V, I_D=30A
* High Switching Speed

■ SYMBOL



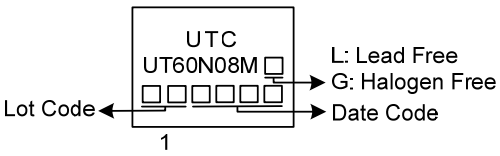
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT60N08ML-TA3-T	UT60N08MG-TA3-T	TO-220	G	D	S	Tube

Note: Pin Assignment: G: Gate D: Drain S: Source

UT60N08MG-TA3-T (1)Packing Type	(1) T: Tube
(2)Package Type	(2) TA3: TO-220
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	80	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	60	A
	Pulsed (Note 2)	I_{DM}	120	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	24.2	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.9	V/ns
Power Dissipation		P_D	70	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L = 0.1mH, I_{AS} = 22A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ 30A, di/dt ≤200A/μs, V_{DD} ≤BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

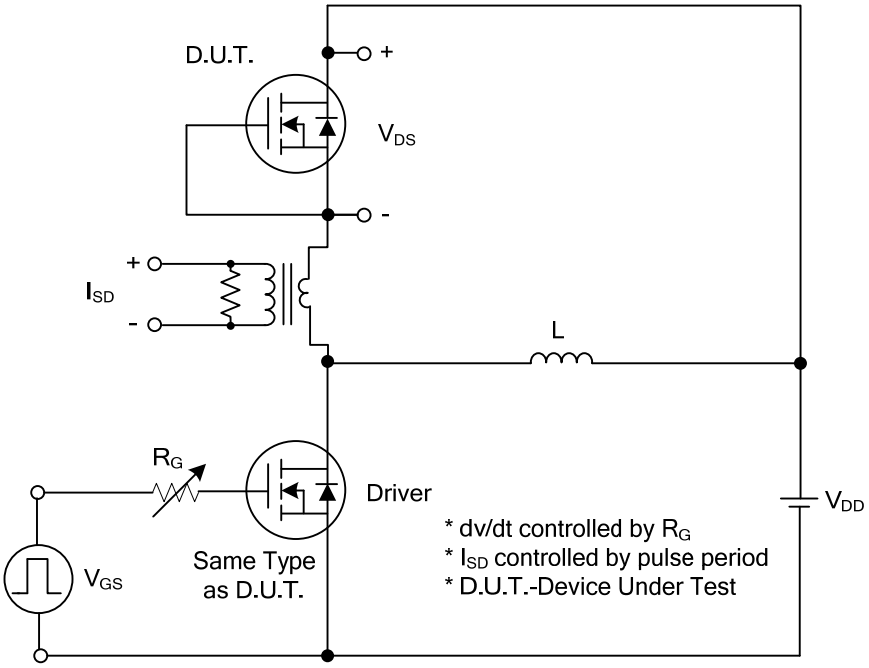
PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	1.78	°C/W

■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

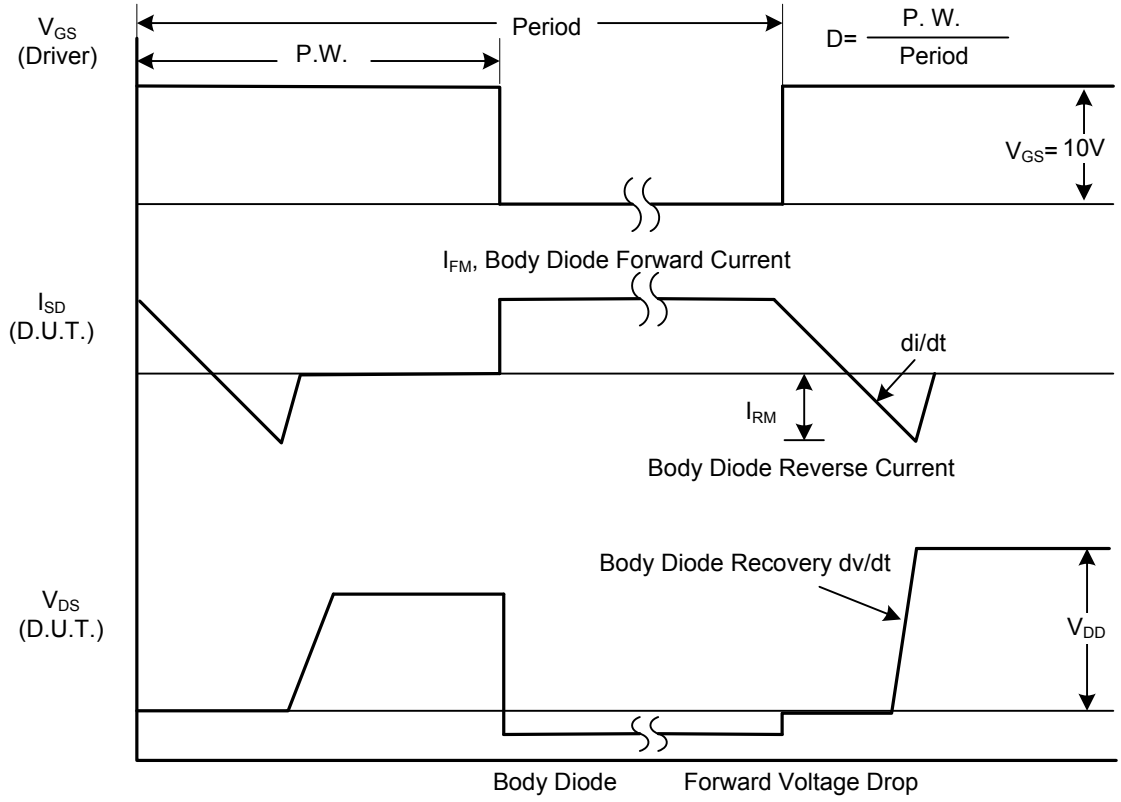
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D= 250μA	80			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=80V, V_{GS}=0V			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V, V_{DS}=0V			100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=30A			12	mΩ
			V_{GS}=4.5V, I_D=30A			15	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0 MHz		2246		pF
Output Capacitance		C_{OSS}			225.3		pF
Reverse Transfer Capacitance		C_{RSS}			187.1		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=64V, V_{GS}=10V, I_D=60A I_G=1mA (Note 1, 2)		76.9		nC
Gate-Source Charge		Q_{GS}			6.5		nC
Gate-Drain Charge		Q_{GD}			32.3		nC
Turn-on Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=40V, V_{GS}=10V, I_D=60A, R_G=6Ω (Note 1, 2)		10.1		ns
Rise Time		t_R			18.1		ns
Turn-off Delay Time		$t_{D(OFF)}$			61.6		ns
Fall-Time		t_F			24.3		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				60	A
Maximum Body-Diode Pulsed Current		I_{SM}				120	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	V_{GS}=0V, I_S=60A			1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	V_{GS}=0V, I_S=60A, dI_F/dt=100A/μs (Note1)		47		ns
Reverse Recovery Charge		Q_{rr}			143.3		nC

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

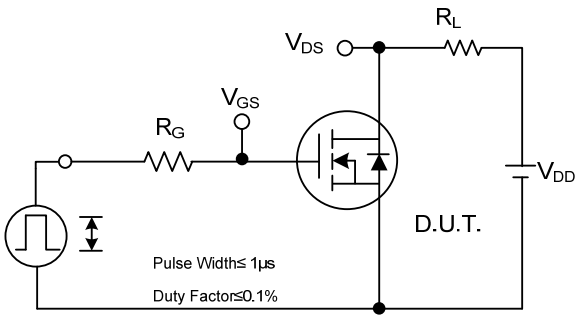


Peak Diode Recovery dv/dt Test Circuit

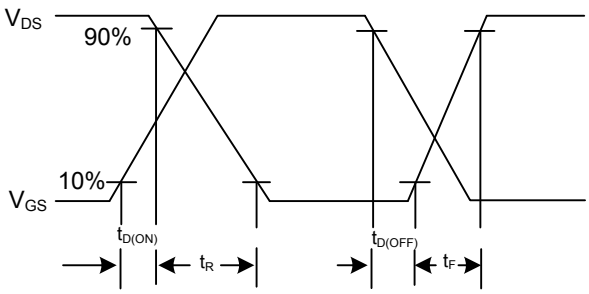


Peak Diode Recovery dv/dt Waveforms

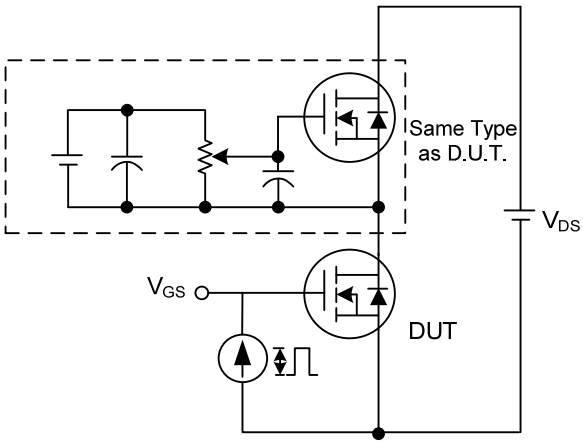
■ TEST CIRCUITS AND WAVEFORMS



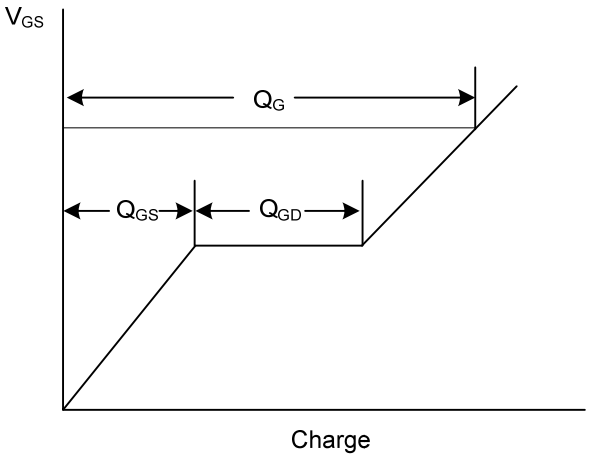
Switching Test Circuit



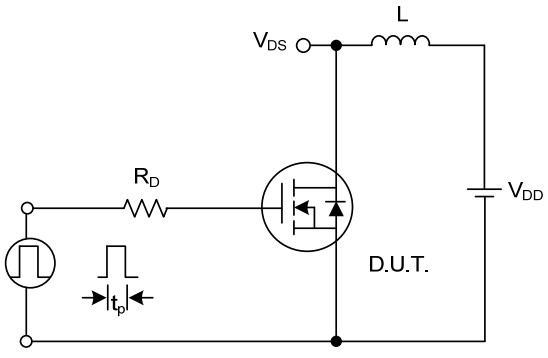
Switching Waveforms



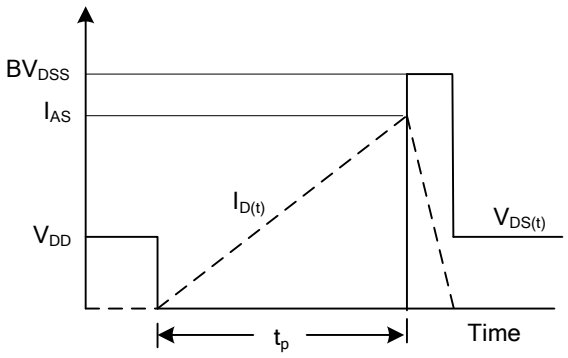
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms